Center for
Educator Compensation Reform

TIF Challenges in Education Information Systems and Knowledge Management

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Overview

- Characteristics of quality data
- Decision support needs of TIF grantees
  - Incentive plan requirements
  - Evaluation and monitoring needs
- Examples of data quality challenges and some solutions for overcoming them

What is Quality Data?

- Accurate – Is the data right?

- Granular – Is the data detailed enough?

- Valid – Does the data represent reality?

- Integrated – Can data from multiple systems be connected?

- Relational – How does the organization of data affect data utility?

- Reducible – How can districts reduce data burden into meaningful analytics?

- Actionable – Do data consumers know what to do?

TIF Decision Support User Needs

- Transparency
  - Incentive plans are high stakes for students and adults
- Validity of metrics
  - Multiple sources – Multiple observations
  - Consequential validity
- Responsiveness and timeliness
  - Are data systems and reporting procedures adequate to provide results within a time frame needed for incentives
- Granularity
  - Data on individual student and teachers by subject
  - Diagnostics as part of a high stakes can corrupt intent

Challenges to Success in Decision Support

- Challenges can co-exist and compound each other

- Have social/organizational as well as technical roots

- Should be prioritized given grantees' constraints, priorities, and theory of action

Example 1: Connecting Teacher Data From SIS and HR

- Teachers in HR system did not match teachers in SIS (≈70% matched)
- Context:
    - Human Resources system (PeopleSoft) creates persistent and unique IDs (aka emplIDs)
    - SIS (eSIS) creates non-persistent but unique IDs (aka TeacherIDs)
    - School staff create and manage TeacherIDs throughout the school year, but especially during scheduling periods. Complex workflow not well represented by SIS interface
- Challenges represented: accuracy, validity, integration

Example 1 (continued)

- School staff use SIS in a way that meets local scheduling needs – here are some actual teacher 'names':
  - Tch A - MRP2, Tch B - MRP1, Tch C - Sci6B, Tch D – Orchestra
- Some buildings use organizational structures that are not manageable with the data structure provided by the district
- Analyses:
  - Analyze matching patterns – Where is matching best? Worst?
    - For teachers assigned a grade level in SIS, roughly 15% (≈500) cannot be matched; disproportionate number in 8th and 9th
    - For teachers with no grade level in SIS, 55% (≈1,500) cannot be matched
  - Analyze workflows that impact data quality – Why is data quality compromised?
    - Create process flows for major tasks at schools such as scheduling, creating new rosters, keying teacher information

Example 1 (continued)

- Solutions:
  - Build data quality checks for data-entry screens (e.g., leverage Oracle exception error) that use look up tables (improves integration)
  - Create data quality management tools (e.g., reports, training procedures)
  - Build support of stakeholders to emphasize quality – e.g., training, tech support,
  - Identify true needs of schools (e.g., scheduling logistics) and develop use-cases
  - Provide feedback to SIS vendor to improve underlying SIS data model

Example 2: Connecting Teachers to Students

- Knowing what teachers taught what students is a critical linkage for TIF projects
- Context
  - Schools use a variety of organizational designs
  - SIS data structures for enrollment data may not capture non-traditional instructional models
  - Additional programs (e.g., after-school activities, pull-out specialists) exist
- Challenges: Validity, Granularity, Quality

Example 2 (continued)

- Mobility –
  - Introduces multiple teachers
- Due course titles in SIS reflect true curricular content?
- Team teaching –
  - Does SIS data indicate when team teaching is occurring? Who teaches what?
- Pull outs, Tutoring, After-school programs (SESs) –
  - Implications for VAA control variables

Example 2 (continued)

Solutions
- Audit data accuracy in SIS – use sampling, target initial analyses on grades that are easier to assess student – teacher linkages (assess quality)
- Examine capacity of SIS to track SES, team teaching, etc… (assess validity)
- Build incentives for schools to accurately record teacher of record; verify with teachers (improve validity)
  - Example: MPS requires teachers to build a course roster from a list of enrolled students. Redundant, but serves to validate the accuracy teacher / student links in SIS. (improves quality through integration)
- Confirm accuracy of SIS data through phone calls, other local systems, and pen and paper questionnaires (quality and validity)

Example 3: Classifying Teachers Into Categories

- Teachers often teach across grades and content areas
- Context
  - What teachers teach both Math and Science?
  - What teachers teach more than one grade?
  - What is a course anyways?
- Challenges: Validity, Reduction, Accuracy

Example 3 (continued)

- Solutions
  - Design an evaluation system that is aligned with the complex nature of schools, doesn't force teachers into categories, and captures the nature of teacher's jobs (improve validity)
  - Mine enrollment data rather than HR data (improves accuracy, validity)
  - If teachers must be categorized into a single grade or content area then a couple of approaches might work
    - Use the number of students
    - Use the number of courses

Summary

- Each TIF project has unique IT needs and priorities

- Data quality is critical for most if not all TIF projects.

- Data quality has several key components – these characteristics helps us understand what to do first

- Improving data quality will involve both short- and long-term solutions

- Priorities should reflect constraints, priorities, and theory of action

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